



#625 – August 2024



JUG

Publication of the
Northern California
Contest Club

NCCC

NCCC – 54 years
of contesting
excellence

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NCCC MEETING

<https://nccc.cc/meetings.html>

ZOOM: Tue 13 Aug 2024 1830 PDT

President's Report

David West, KO6M

Breaking News! NCCC President MIA!



David, KO6M, has not been heard from since July. Whereabouts unknown, last contact was early July. Please contact the Editor if you have any information regarding his QTH. Meanwhile ...

IDXC 2025

The International DX Convention will be held at the Visalia Convention Center on April 11-13th, 2025. You can visit the new website at <http://www.dxconvention.com>

In the coming weeks and months, we will be announcing:

- 1) Participating Hotels & Registration Dates.
- 2) Convention Registration.
- 3) Speakers and Programs.
- 4) Major Prizes.
- 5) Hourly Prizes.
- 6) Optional programs such as Contest Academy and DX Academy.
- 7) Friday Dinners.
- 8) Exhibitors displaying their latest products.



About NCCC

Officers and Directors, 2023-2024 Contest Season

President: David West, [KO6M](#)
 Vice-President/Contest Chairman: [Chris Tate, N6WM](#)
 Secretary: Greg Alameda, [KK6PXT](#)
 Treasurer: Nian Li, [WU6P](#)
 Past President: [David Jaffe, WD6T](#)
 Director: [Jim Brown, K9YC](#)
 Director: [John Miller, K6MM](#)
 Director: [Ed Radlo, AJ6V](#)

Volunteers

Charter Member: [Rusty Epps, W6OAT](#)
 Awards Chair: [Gary Johnson, NA6Q](#)
 California QSO Party Chair: [Dean Wood, N6DE](#)
 QSL Mgr [\[K6ZM\]](#): **vacant**
 QSL Mgr [\[K6CQP/N6CQP/W6CQP\]](#): [Dean Wood, N6DE](#)
 NAQP Teams: **vacant**
 NA CW Sprint Teams: [Bob Vallio, W6RGG](#)
 NCCC Email Reflector Admin: [Phil Verinsky, W6PK](#)
 Worked All CA Counties Award: [Fred Jensen, K6DGW](#)
 Photographer: [Bob Wilson, N6TV](#)

NCCC Thursday Night Contesting

NCCC Sprint: [Tom Hutton, N3ZZ](#)
 NS CW Ladder: [Bill Haddon, N6ZFO](#)
 NS RTTY Sprint/Ladder: [Ed Radlo, AJ6V](#)

Communications

Webmaster: [John Miller, K6MM](#)
 Webinars: [Bill Fehring, W9KKN](#)
 Membership: [Gary Johnson, NA6O](#)/[Ian Parker, W6TCP](#)

JUG Editor

[Fred Jensen, K6DGW](#): k6dgwnv@gmail.com
 Home: 775.501.5488
 Cell: 530.210.0778

VPCC Report

Chris Tate, N6WM



This month I thought I would dedicate a little column bandwidth to something many of us are seeing, talking about, and witnessing the effects of in our contest shacks: “**Change.**”

It is no secret that the demise of another one of our hallowed magazines, CQ Magazine, was in a slow burn decline over a series of years. This started with a series of missed publishing deadlines, poor home delivery reliability, and eventually even the electronic versions which were not published consistently, despite constant emails requesting new subscriptions from its reader base. The final nail in the coffin came with the passing of Richard Ross, K2MGA, publisher/backbone of CQ at the age of 84.

For many hams worldwide, this is a sad moment as we lose another platform for grassroots contributions from the ham community, as well as news of the day, and contest results from the CQ- sponsored contests.

We in the radiosport community placed high importance on the magazine that sponsored the largest amateur radio events ... CQ Worldwide contest series, CQ Worked all Prefix series, and the smaller CQ contest contributions.

So... now what? Well, there is a diamond in the rough regarding sponsorship and management of CQ contests. The demise of CQ Magazine was anticipated by the World Wide Radio Operators Foundation, Inc. Started in 2009, the WWROF has been silently funding and handling duties such as log-checking software, log submission robots, etc. A deeper dive shows that the WWROF also has been handling CQ magazine plaque sponsorship and awards management, including underwriting and managing sponsored plaque donations. There are lots of familiar names that should instill confidence in the contest community that our great contests will continue. Currently the WWROF is chaired by Tim Duffy, K3LR, and has a number of additional influential members on the Board, including Doug Grant, K1DG, John Dorr, K1AR, and our own Bob Cox, K3EST, and Trey, N5KO. (See a complete list of mission and services at <https://wwrof.org/> This is a stable organization and is a great place to donate to assist in keeping this group solvent into the future.



What does this mean for us, the enthusiastic CQ contest participants? The infrastructure for CQ contests has already been managed separately for years, and the WWROF has seamlessly taken over the contest sponsorship. The contests will still have the same name ... (perhaps minus the “magazine” suffix) so CQ Worldwide and CQ WPX will remain the name of that familiar series. Their awards program remains intact as well as log submittal, scoring, awards, and other components of successful contest management.

The real change is the untethering of publishing deadlines and contest results. We are already seeing the signs of this change as the CQ WPX results were pushed out in record time and plaques were sent out 60 days after the contest completed! As the additional CQ contests normalize around this, we can expect a much more rapid post contest adjudication cycle.

But what about the results? Rest assured, all radiosport authors(myself included), contest managers, and support staff volunteers are all still there. The difference is that results will now be found at the respective individual contest web sites, and at a much more rapid pace than was when they were tied to a magazine publishing schedule. While we sadly say goodbye to CQ Magazine, as another publication loss to history we also thank the WWROF and its Directors and CQ Contest Hall of Famers and Volunteers, for their anticipation and seamless takeover of these incredible operating events so they can continue indefinitely for years to come.

Change can be tough, losing something that has been part of our hobby for as long as we can remember is also tough, but our Radiosport community is strong, and the WWROF is a great example of that. Thanks to them, the CQ Contests we all enjoy are in good hands.

N5J Team Under Way to Jarvis Island

Via AA7JV – 3 Aug 2024

The MV Magnet, with the N5J team and three USFWS scientists on board, got under way at 0500 AM from American Samoa for Jarvis island. The time required to cover the distance of 1050 Nautical Miles (1940 km) depends on the boat-speed that we are able to maintain. Currently we are cruising at 15 knots (27 kmph) in light winds and moderate seas (waves of 3 to 5 feet). According to the forecast this favorable weather should continue for the next three days. Although we are likely to encounter some opposing currents, we expect to arrive at Jarvis the morning of August 6. If for some reason we need to slow down, we will time our arrival for the morning of Wed, 7 August.

More information at: [Jarvis Is. Website](#)

UPDATE – 7 Aug 2035Z, just prior to publication: N5J on 14029 ... weak but workable.



Upcoming State/Province QSO Parties

A Quick Reference for those participating in the Intra-Club QSO Party Challenge or just looking for a weekend contest fix

CONTEST	DATE(S)/TIME(S)
Hawaii	8/24 0400Z – 8/26 0400Z
Kansas	8/24 1400Z – 8/25 0200Z 8/25 1400-2000Z
Ohio	8/24 1600Z – 8/25 0400Z
Tennessee	9/1 1700Z – 9/2 0300Z
Colorado	Not yet posted
Texas	9/21 1400Z – 9/22 0200Z 9/22 1400Z to 2000Z
Iowa	9/21 1400Z – 9/22 0200Z
New Hampshire	9/21 1600Z -- 2200Z 9/22 1400Z -- 2000Z
New Jersey	9/21 1600Z – 9/22 0359Z
Washington Salmon Run	9/21 1600Z -- 9/22 0700Z 9/22 1600Z -- 2400Z
Maine	9/28 1200Z – 9/29 1200Z
CALIFORNIA QSO PARTY	10/5 1600Z – 10/6 2200Z
Nevada	10/12 0300Z – 10/13 2100Z
Arizona	10/12 1500Z – 10/13 0500Z
Pennsylvania	10/12 1600Z – 10/13 0400Z 10/13 1300Z – 2200Z
South Dakota	10/12 1800Z – 10/13 1800Z
New York	10/19 1400Z – 10/20 0200Z
Illinois	10/20 1700Z – 10/21 0100Z



Northern California Contest Club

Excellence In Amateur Radio Contesting

Sierra Chapter “Truckee Radiogrill”

(Ed. Note: The Sierra Chapter Staff Photographer was indisposed and unable to attend the Radiogrill so your Editor needed to pick up the job, demonstrating once again what a truly lousy photographer I am)

July 21st marked the resumption of the annual gathering of the High Sierra Chapter of the NCCC at the Truckee residence of Rick, N6XI, and Ann, KD6MOB Tavan overlooking Boca Reservoir, which is pretty much full right now. It was a perfect day, sunny and warm on the deck amid the trees and a couple of towers with the usual antennas. Rick, a Beta-tester for Elecraft, had his K4 operational and remoted to his K4 in Saratoga, with the software remote running on the TV in the family room.

In Attendance

Rick, N6XI & Ann, KD6MOB
 Tom, K5RC
 Jim, K9JM
 Hank, W6SX, & Rhonda
 Doug, WE6Z
 Dave, K6TQ
 Stefan, AF6SA
 Oliver, W6NV
 Barry, K6ST
 Todd, KH2TJ
 Jim, W6EU
 Tom, K6EU
 Bob, NZ6G
 Bill, W9KKN
 Dennis, KX7M
 Bob, K6NV
 and K6DGW

Rick and Ann provided the hamburgers and hot dogs with all the usual fixings, and the rest of us ate them. Lots of conversation about all the usual subjects when hams gather.





Tube of the Month

Norm Wilson, N6JV

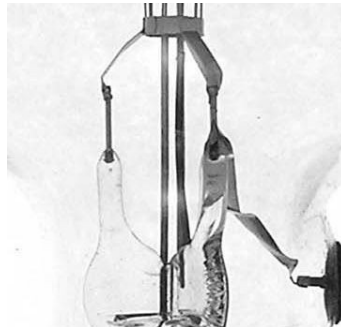
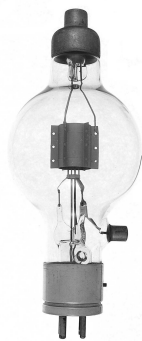
Visit the Tube Museum at n6jv.com

Eimac 50T



From 1936, Eimac marked all their tubes with a date code. This was expanded to add a factory code in WWII at the insistence of the military. The earliest Eimac tubes, the [150T](#) and the [50T](#) weren't usually marked at all. With a close examination of several different 50T tubes, it is possible to develop a timeline based on the evolution of the construction techniques.

The first 50Ts began production in late 1934. The 50T was rated at 75 watts and had a mu of 12. The original tube had a stepped plate cap, metal base, elongated double loop shaped filament and a filament press with



three long glass fingers that supported the grid. Plate and grid were made of tantalum metal. Wires that supported the grid were molded into the fingers. An additional wire was molded into the press and it was used to support the center of the filament. The grid connection was a metal ribbon that was wrapped

around one of the grid support wires.

The requirement for the assembly to be done by a glass blower was an obvious problem for productivity. All alignment had to be done with a torch. Having the grid structure made separately must have helped assembly. In the second version, the three-grid support wires were terminated in upside-down U-shaped tabs that could be placed over the glass fingers. The glass blower just had to assemble the filament wires and assure that the fingers were the same length. The ribbon from the grid cap was attached to one of the tabs. The plate cap was changed to one with a thin lower skirt.

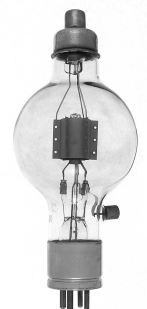


The third version had a spiral filament that didn't require an additional support wire. Perhaps 10% of the tubes with the spiral filament were made with a single, flat press with two fingers. Each of these

changes show an improvement in the ease of assembly, mechanical stability or cost of production.

In 1936 the 50T became the [100T](#) with the plate and grid connections made to use

[heat dissipating connectors](#).



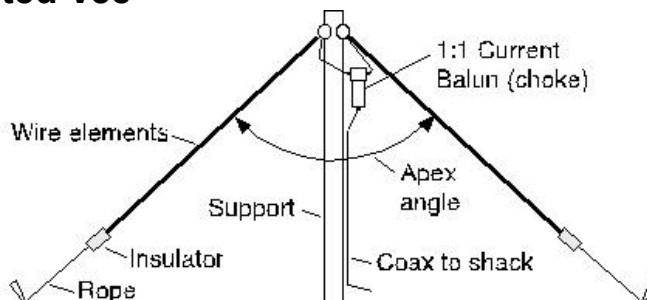


Antenna of the Month

Gary Johnson, NA6O

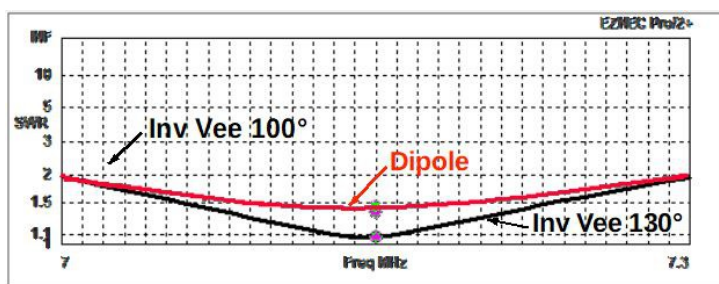
The Inverted Vee

One of the natural modification to a simple half-wavelength dipole is the *Inverted Vee*. As you may know, most of the radiated energy comes from the part of an antenna where current is greatest, and that's the center of a dipole. So your first objective is to get that up as high and clear as you can. But if you only have one tall support, attach the center and the feed line to that, and let the ends of the antenna slope downward. That forms the inverted vee configuration and it's almost as good as the flat dipole.



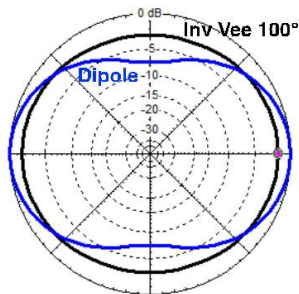
What are the properties of an inverted vee, compared to a flat dipole at the same height? What you'll add is some vertically-polarized radiation, a more omnidirectional pattern, and sometimes a lower SWR. What you'll lose is a bit of peak gain since the pattern of the dipole has diminished. Exact results will depend upon A) the apex angle and B) height above ground.

I did some simulation in EZNEC to compare a 40 m dipole to an inverted vee. Everyone should explore this free and very powerful program, available from [EZNEC](http://www.eznr.com/) and discussed in the ARRL Antenna Handbook among other places.

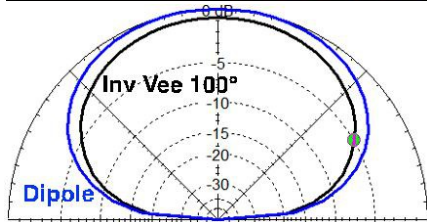


Both antennas were placed at 30 ft (30 ft apex for the inverted vee), and I tested the apex angle at 100 and 130 degrees. The SWR chart shows the differences but any of these are completely acceptable to any radio with an antenna tuner. In general, the smaller the apex angle, the lower the feedpoint impedance but eventually the mismatch could become problematic if you collapse the antenna much below about 90 degrees. Also, if

the ends get very close to the ground the impedance can change rapidly. Keep them up 6 ft or so and the SWR will be fine.



As the inverted vee arms swing downward (smaller apex angle), the pattern in azimuth becomes more omnidirectional. Note that this dipole doesn't have a very strong pattern either. That's because it's quite low, at only 1/4 wavelength in height. You really need to get a dipole up 1/2 wavelength or higher in order to see substantial nulls off the ends (vertical axis in the plot). And if they were up at 1/2 wavelength, peak gain of both antennas would be 3 dB greater. So the rule "as high as possible" is a good one.



Comparing the elevation patterns, there is again little difference, only a couple of dB even with the steeper arms. Also you can see that the gain is highest **straight up**, which is typical of any low, horizontally-polarized antenna. This is ok for local communication, but less desirable for long-range DX where low takeoff angles are needed. Still, you do radiate significant energy at some low angles and the antenna is generally useful.

In conclusion, the inverted vee can be more convenient to install than a dipole since only the center is at high altitude, and you pay only small penalty in terms of overall performance. Note that you can turn it into a multi-band antenna just like a dipole by adding parallel elements (a fan) or traps.

Editor Notes



Major thanks to Rick, N6XI, and Ann, KD6MOB, for hosting the BBQ gathering at their Truckee home! Had really great attendance, the hamburgers and hot dogs were super, the view from the deck was beautiful, and the weather was perfect ... a really fun time for all who could make it. NCCC covers a lot of area and regional gatherings such as this offer in-person opportunities to distant members who cannot make the Bay Area meetings.

This issue of the JUG contains an experiment – both right and left justified text. Opinions vary, some say it looks and possibly reads better. Others have differing opinions. Comments are solicited ... [Comment here.](#)

And, a public service to the several winemakers who are members of NCCC: There is [or was] a winery on the slope of Haleakala [dormant volcano on Maui] above Makena Beach that has proved conclusively that you can't make drinkable wine from a pineapple. There should be no need to ask how I know this.

Another experiment for the JUG: Hank, W6SX, famous for winning the first ... and only ... NCCC Worked All Contests award, provided an example of unconventional CW as a test to see if we can embed links to Google Drive. Just click on the call sign below ...we guarantee the link is safe. No guarantee that it works however.

K2SSX

Reports to the editor, including the browser you are using, will be appreciated. Click on the Comment link above.

Finally, the goal for the JUG is to publish before the next meeting which usually occurs on the second Tuesday of each month. To achieve this, the deadline for JUG contributions and columns will normally be the previous Wednesday. I'll post a couple of reminders to the NCCC groups.io list but you can mark your calendars.



NCCC Membership Information

If you wish to join NCCC, please fill out an application for membership, which will be read and voted upon at our monthly meeting. To join, you must reside within club territory which is defined as everything in California north of the Tehachapi's up to the Oregon state line, and part of northwestern Nevada (anything within our ARRL 175-mile radius circle centered at 10 miles north of Auburn on Highway 49).

Life Memberships

Life memberships are \$250.00 Contact secretary.nccc@gmail.com. Members who have reached 80 years of age have and been an NCCC member for 20 or more years are eligible for Honorary Life Membership ("80/20 Rule"). Contact secretary.nccc@gmail.com

JUG Articles Wanted!

Your help allows us to produce a quality newsletter. Please consider submitting an article! The editor welcomes any and all relevant articles for inclusion in the JUG. The preferred format is plain, unformatted ASCII text, MS Word (.doc/.docx) are acceptable. Indicate the insertion point and title of diagrams and pictures in the text and attach photos/diagrams separately. Pictures should be as high a resolution as available. Please do not spend time formatting your submittal, the publication templates will re-format everything. Send your material to k6dgwnv@gmail.com indicating "JUG Submittal" in the subject.

Northern California Contest Club Reflector—Guidelines

The NCCC email reflector is devoted to the discussion of contesting. Topics include contests, station building, dxpeditions, technical questions, contesting questions, amateur radio equipment wants/sales, score posting, amateur radio meetings/ conventions, and membership achievements. Postings may not include personal attacks, politics, or off-subject posts. Such postings will be considered a violation of the Guidelines

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Welcome to the NCCC Land's End store. You can choose many different products and add a custom-embroidered NCCC logo.

If you would like to add your name and/or call sign, click the Add Personalization button when designing your garment (\$8 charge, 10 character limit).

If you have questions, contact the NCCC secretary at: secretary.nccc@gmail.com



Northern California Contest Club

[NCCC Lands' End Store](https://business.landsend.com/store/nccc/)

We are pleased to announce that the new NCCC Land's End store is online! You can choose from an array of shirts, jackets, and hats and apply your choice of custom-embroidered NCCC logos: A plain one, or one that also says Fifty Years. And, you can personalize your item by adding your name and/or call sign. The store is open 24/7 and items are shipped directly to you. No more waiting for everyone else to make up their minds on a group purchase.

<https://business.landsend.com/store/nccc/> or from the NCCC website: <http://nccc.ccc/members/lestore.html>
Thanks to W6TCP for helping to set this up. Instructions for purchases from Lands' End NCCC Store

1. Go to <https://business.landsend.com/store/nccc/>
2. Click on Men's or Women's link, then choose item(s)
3. Pick color, inter quantity of each size you want to order.
4. Click Apply Logos and Personalizations. This will display the logo choices. Try them out. It will show you what they look like on your chosen fabric color.
5. Select a location for logo (left side, ride side, back, etc)
6. Click Apply Logo.
7. Optionally, click Add Personalization to add your name or call sign (\$8.00, 10 character limit)
8. Click Add to Bag and Continue Shopping or.



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K4 HIGH-PERFORMANCE DIRECT SAMPLING SDR



A direct-sampling SDR you'll love to use

Our new K4 transceiver harnesses advanced signal processing while retaining the best aspects of the K3S and P3. It features a 7" touch display, plus a rich set of dedicated controls. Per-VFO transmit metering makes split mode foolproof. Band-stacking registers and per-receiver settings are versatile and intuitive. Control usage information is just one tap away thanks to a built-in help system.

Modular, hybrid architecture adapts to your needs

The basic K4 covers 160-6 m, with dual receive on the same or different bands. The K4D adds diversity receive, with a full set of band-pass filters for the second receiver. (Thanks to direct RF sampling, there's no need for crystal filters in either the K4 or K4D.) The K4HD adds a dual superhet module for extreme-signal environments. Any K4 model can be upgraded to the next level, and future enhancements—such as a planned internal VHF/UHF module—can be added as needed.

Single or dual panadapter, plus a high-resolution tuning aid

The main panadapter can be set up as single or dual. Separate from the main panadapter is our per-receiver *mini-pan* tuning aid, with a resampled bandwidth as narrow as +/- 1 kHz. You can turn it on by tapping either receiver's S-meter or by tapping on a signal of interest, then easily auto-spot or fine tune to the signal.

Comprehensive I/O, plus full remote control

The K4's rear panel includes all the analog and digital I/O you'll ever need. All K-line accessories are supported, including amps, ATUs, and our K-Pod controller. The Video output can mirror the K4 screen or display a high-res Panadapter only screen. Via Ethernet, the K4 can be 100% remote controlled from a PC, notebook, tablet, or even another K4, with panadapter data included in all remote displays. Work the world from anywhere—in style!

K4 KEY FEATURES

Optimized for ease of use

Modular, upgradeable design

7" color screen with touch and mouse control

ATU with 10:1+ range, 3 antenna jacks

Up to 5 receive antenna sources

Full remote control via Ethernet



The K4 interfaces seamlessly with the KPA500 and KPA1500 amplifiers

"The performance of their products is only eclipsed by their service and support. Truly amazing!" Joe - W1GO



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IC-V3500 | 144MHz FM Mobile

• 65W of Power for Long Range Communications • 4.5 Watts Loud & Clear Audio • Modern White Display & Simple Operation • Weather Channel Receive & Alert Function



IC-7851 | HF/50MHz Transceiver

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IC-705 | HF/50/144/430 MHz All Mode Transceiver

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IC-2300H | VHF FM Transceiver

• 65W RF Output Power • 4.5W Audio Output • MIL-STD 810 G Specifications • 207 alphanumeric Memory Channels • Built-in CTCSS/DTCS Encode/Decode • DMS



IC-7300 | HF/50MHz Transceiver

• RF Direct Sampling System • New "IP+" Function • Class Leading RMDR and Phase Noise Characteristics • 15 Discrete Band-Pass Filters • Built-In Automatic Antenna Tuner



IC-7100 | All Mode Transceiver

• HF/50/144/430/440 MHz Multi-band, Multi-mode, IF DSP • D-STAR DV Mode (Digital Voice + Data) • Intuitive Touch Screen Interface • Built-in RTTY Functions

IC-V86 | VHF 7W HT

• 7W Output Power Plus New Antenna Provides 1.5 Times More Coverage • More Audio, 1500 mW Audio Output • IP54 & MIL-STD 810G-Rugged Design Against Dust & Water • 19 Hours of Long Lasting Battery Life • 200 Memory Channels, 1 Call Channel & 6 Scan Edges



IC-7610 | HF/50 MHz All Mode Transceiver

• Large 7-inch color display with high resolution real-time spectrum scope and waterfall • Independent direct sampling receivers capable of receiving two bands/two modes simultaneously



IC-2730A | VHF/UHF Dual Band Transceiver

• VHF/VHF, UHF/UHF simultaneous receive • 50 watts of output on VHF and UHF • Optional VS-3 Bluetooth® headset • Easy-to-See large white backlight LCD • Controller attachment to the main Unit



IC-T10 | Rugged 144/430 MHz Dual Band

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• 10 kHz to 3 GHz Super Wideband Coverage • Real-time Spectrum Scope w/Waterfall Function • Remote Control Function through IP Network or USB Cable • Decodes Digital Incl P25, NXDN™, D-STAR • SD Card Slot for Receiver Recorder



ID-5100A Deluxe VHF/UHF Dual Band Digital Transceiver

• Analog FM/D-Star DV Mode • SD Card Slot for Voice & Data Storage • 50W Output on VHF/UHF Bands • Integrated GPS Receiver • AM Airband Dualwatch

ID-52A | VHF/UHF D-STAR Portable

• Bluetooth® Communication • Simultaneous Reception in V/V, U/U, V/U and DV/DV • Enriched D-STAR® Features Including the Terminal Mode/Access Point Mode • UHF (225-374.995MHz) Air Band Reception



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FTDX101MP | 200W HF/50MHz Transceiver

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- Unmatched SDR Receiving Performance • Band Pass Filters Dedicated for the Amateur Bands • High Res 4.3-inch TFT Color Touch Display • AESS: Acoustic Enhanced Speaker System with SP-40 For High-Fidelity Audio • Built-in High Speed Auto Antenna Tuner



FTM-400XD | 2M/440 Mobile

- Color display-green, blue, orange, purple, gray • GPS/APRS • Packet 1200/9600 bd ready • Spectrum scope • Bluetooth • MicroSD slot • 500 memory per band



FTDX10 | HF/50MHz 100 W SDR Transceiver

- Narrow Band and Direct Sampling SDR • Down Conversion, 9MHz IF Roofing Filters Produce Excellent Shape Factor • 5" Full-Color Touch Panel w/3D Spectrum Stream • High Speed Auto Antenna Tuner • Microphone Amplifier w/3-Stage Parametric Equalizer • Remote Operation w/optional LAN Unit (SCU-LAN10)



FT-891 | HF+50 MHz All Mode Mobile Transceiver

- Stable 100 Watt Output • 32-Bit IF DSP • Large Dot Matrix LCD Display with Quick Spectrum Scope • USB Port Allows Connection to a PC with a Single Cable • CAT Control, PTT/RTTY Control



FT-70DR C4FM/FM 144/430MHz Xcvr

- System Fusion Compatible • Large Front Speaker delivers 700 mW of Loud Audio Output • Automatic Mode Select detects C4FM or Fm Analog and Switches Accordingly • Huge 1,105 Channel Memory Capacity • External DC Jack for DC Supply and Battery Charging



FT-5DR C4FM/FM 144/430 MHz Dual Band

- High-Res Full-Color Touch Screen TFT LCD Display • Easy Hands-Free Operation w/Built-In Bluetooth® Unit • Built-In High Precision GPS Antenna • 1200/9600bps APRS Data Communications • Supports Simultaneous C4FM Digital • Micro SD Card Slot



FT-991A | HF/VHF/UHF All Mode Transceiver

- Real-time Spectrum Scope with Automatic Scope Control • Multi-color waterfall display • State of the art 32-bit Digital Signal Processing System • 3kHz Roofing Filter for enhanced performance • 3.5 inch Full Color TFT USB Capable • Internal Automatic Antenna Tuner • High Accuracy TCXO



FTM-300DR | C4FM/FM 144/430MHz Dual Band

- 50W Output Power • Real Dual Band Operation • Full Color TFT Display • Band Scope • Built-in Bluetooth • WIRES-X Portable Digital Mode/Mode with HRI-200



FT-2980R | Heavy-Duty 80W 2M FM Transceiver

- 80 watts of RF power • Large 6 digit backlit LCD display for excellent visibility • 200 memory channels for serious users



FT-65R | 144/430 MHz Transceiver

- Compact Commercial Grade Rugged Design • Large Front Speaker Delivers 1W of Powerful Clear Audio • 5 Watts of Reliable RF Power With-in a compact Body • 3.5-Hour Rapid Charger Included • Large White LED Flashlight, Alarm and Quick Home Channel Access



FTM-6000R | 50W VHF/UHF Mobile Transceiver

- All New User Operating Interface-E20-III (Easy to Operate-III) • Robust Speaker Delivers 3W of Clear, Crisp Receive Audio • Detachable Front Panel Can Be Mounted in Multiple Positions • Supports Optional Bluetooth® Wireless Operation Using the SSM-BT10 or a Commercially Available Bluetooth® Headset



FTDX101D | HF+6M Transceiver

- Narrow Band SDR & Direct Sampling SDR • Crystal Roofing Filters Phenomenal Multi-Signal Receiving Characteristics • Unparalleled -70dB Maximum Attenuation VC-Tune • 15 Separate (HAM 10 + GEN 5) Powerful Band Pass Filters • New Generation Scope Displays 3-Dimensional Spectrum Stream



FTM-200DR | C4FM/FM 144/430MHz Dual Band

- 1200/9600bps APRS® Data Communications • 2" High-Res Full-Color TFT Display • High-Speed Band Scope • Advanced C4FM Digital Mode • Voice Recording Function for TX/RX



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